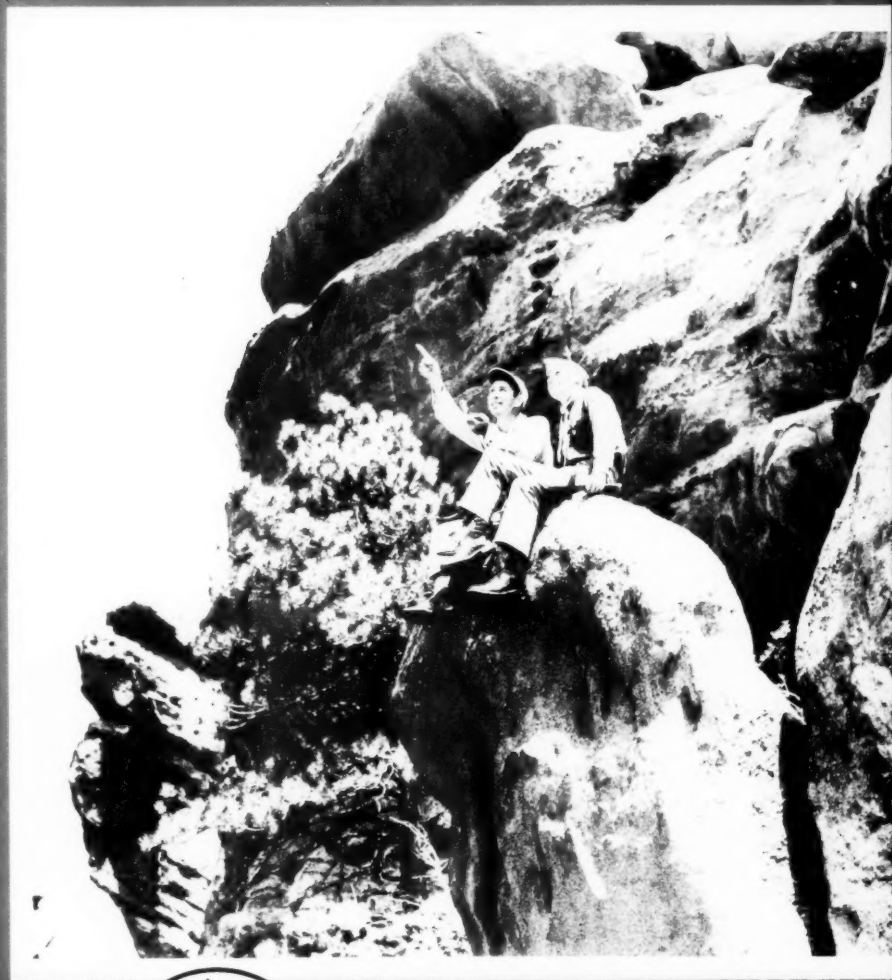


GEO TIMES

Professional News Magazine



October 1957

Volume II, No. 4

Published Monthly by the
American Geological Institute

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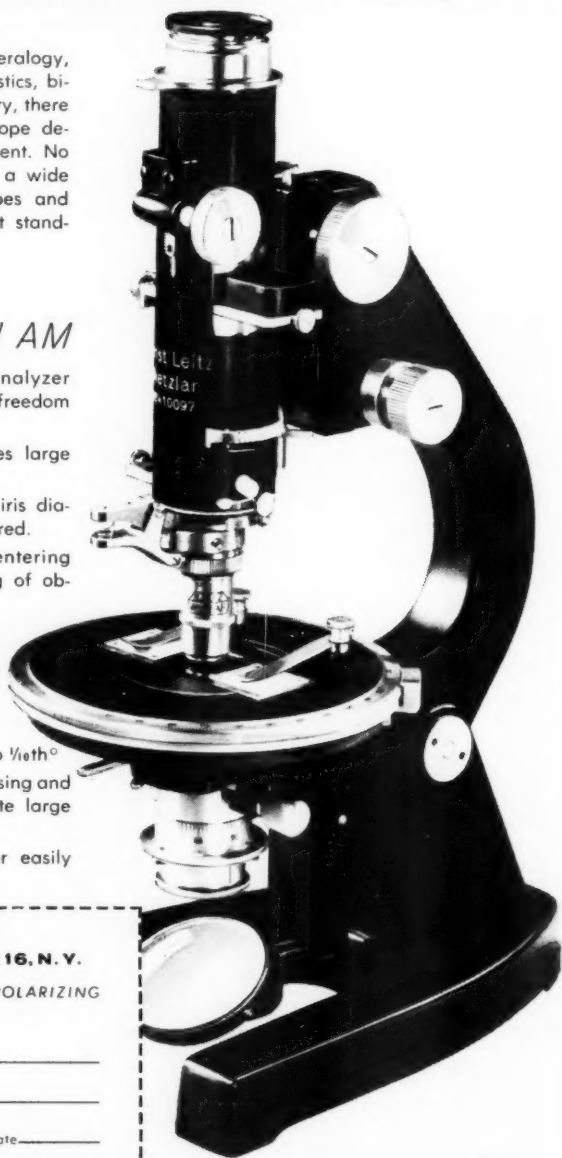
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Calendar

Cooperation of Society Secretaries in supplying meeting notices for GEOTIMES calendar is requested.

- Oct. 2-4, 1957—AM. SOC. PHOTOGR., Semi-Ann. Mtg., Chase-Plaza Hotel, St. Louis, Mo.
- Oct. 3-5, 1957—MISSISSIPPI GEOLOGICAL SOCIETY Supplementary Field Trip to type area of the Wilcox and Midway groups of West-Central Alabama, starting from Jefferson Davis Hotel, Montgomery, Ala.
- Oct. 4-6, 1957—NINTH INDIANA GEOLOGIC FIELD CONFERENCE on rocks associated with the Mississippian-Pennsylvanian unconformity in SW Indiana. Sponsored by Ind. G.S. & the Dept. of Geol. of Ind. Univ. Spring Mill State Park.
- Oct. 4-6, 1957—49th ANNUAL NEW ENGLAND INTERCOLLEGIATE GEOL. CONF., in the environs of Amherst & central Mass. Spons. by 4-Coll. Geol. Depts., George Bain, Amherst Coll., 1957 Chrmn.
- Oct. 6-9, 1957—AIME: SOCIETY OF PETROLEUM ENGINEERS, Fall Meeting; Adolphus, Baker & Statler Hotels, Dallas, Texas.
- Oct. 9-11, 1957—AIME: FUELS CONF., Coal Div., Chateau Frontenac, Quebec City.
- Oct. 15-18, 1957—SOUTHEASTERN STATES MINING CONF., sponsored by Fla. Sect. AIME & the Soc. of Min. Engrs. of AIME, Hillsboro Hotel, Tampa, Fla.
- Oct. 17-18, 1957—AIME: SOUTHERN CALIF. PETR. Sec. Fall Meeting, Biltmore Hotel, Los Angeles, Calif.
- Oct. 17-19, 1957—PANHANDLE GEOLOGICAL SOCIETY Field Trip of SW Oklahoma, with Okla. Geol. Survey & Univ. of Okla. Re-run of May, 1957 trip, starting at Sayre, Okla. Write: Reservations Comm., P.O. Box 2475, Amarillo, Tex.
- Oct. 17-19, 1957—OPTICAL SOCIETY OF AMERICA, Annual Meeting, Deshler Hilton Hotel, Columbus, Ohio.
- Oct. 17-19, 1957—FOUR CORNERS GEOLOGICAL SOC. FIELD CONFERENCE, 2nd Gallup New Mex. For information write P. O. Box 615, Albuquerque, N. M.
- Oct. 25-26, 1957—ABILENE & FORT WORTH GEOLOGICAL SOCIETIES joint field trip to study lower Penn. & Miss. rocks, NE flank of Llano Uplift in San Saba Co., Tex. Start from Admin. Bldg., Lower Colo. River Admn., Buchanan Dam, Texas.
- Oct. 30-Nov. 1, 1957—ROCKY MTS. MINERALS CONF. AIME, Denver, Colo.
- Oct. 31-Nov. 1, 1957—AAPG, Biennial Mid-continent Regional Mtg., Mayo Hotel, Tulsa, Okla.
- Nov. 3, 1957—SVP ANN. MTG., Acad. Nat. Sci., Philadelphia, Pa.
- Nov. 4-5, 1957—SVP Technical Sessions, with GSA, etc., Atlantic City, N. J.
- Nov. 4-6, 1957—GSA, ANN. MTG., Atlantic City, N. J. Geochem., MSA & PS ann. mtgs. in conjunction.
- Nov. 5-8, 1957—NATIONAL WATER WELL EXPOSITION, Oklahoma City, Okla. Technical sessions Nov. 6 & 7 devoted exclusively to groundwater studies. Write: P. O. Box 222, Urbana, Ill.
- Nov. 6-8, 1957—GULF COAST ASSOC. OF GEOL. SOCIETIES, 7th Ann. Mtg., Roosevelt Hotel, New Orleans, La.
- Nov. 7-8, 1957—AAPG, PACIF. SECT., Los Angeles, Calif.
- Nov. 7-8, 1957—SEGp, PACIFIC COAST SECTION, Ambassador Hotel, Los Angeles, Calif. Write: J. A. Hugus, Western Gulf Oil Co., 900 Wilshire Blvd., Los Angeles.
- Nov. 8-9, 1957—AIME, Central Appalachian Sect., West Virginia Mining Inst., joint meeting, Greenbrier Hotel, White Sulphur Springs, W. Va.
- Nov. 11-14, 1957—SEGp, 27th ANNUAL MEETING, Statler-Hilton Hotel, Dallas, Texas.
- Nov. 18-Dec. 9, 1957—9TH PACIFIC SCIENCE CONGRESS, Pacif. Sci. Assoc., Chulalongkorn University, Bangkok, Thailand.
- Dec. 2, 1957—AMC, Ann. Membership Mtg., Plaza Hotel, New York City.
- Dec. 26-31, 1957—AAAS, Nat. Mtg., Indianapolis, Ind.
- Feb. 16-20, 1958—AIME, ANNUAL MEETING, Hotel Statler, New York City. SEG technical meetings held in conjunction.
- March 3-4, 1958—AIME, SOC. PETROLEUM ENGINEERS, Fourth Annual joint meeting, Rocky Mt. Petroleum Sections, Cosmopolitan Hotel, Denver, Colo.
- Mar. 10-13, 1958—AAPG, ANNUAL MEETING, Biltmore Hotel, Los Angeles, Calif.
- March 27-29, 1958—OPTICAL SOCIETY OF AMERICA, Spring meeting, Sheraton-Park Hotel, Washington, D. C.
- April 17-18, 1958—SEGp, 11th Annual Midwestern Meeting, Mayo Hotel, Tulsa, Okla.
- April 17-18, 1958—AIME, SOC. PETROLEUM ENGINEERS, Gas Technology Symposium, Lou.-Ark., Miss. & East Texas Sections, Shreveport, La.
- Apr. 27-30, 1958—AAPG, ROCKY MTN. SECTION, 8th Ann. Conv., Industrial Bldg., Natrona County Fairgrounds, Casper, Wyoming.
- May 5-6, 1958—AIME, SOC. PETROLEUM ENGINEERS, Third Biennial Secondary Recovery Symposium, Wichita Falls, Texas.
- May 5-7, 1958—AGU, Thirty-Ninth Ann. Mtg., Nat. Acad. Sci., Washington, D. C.
- 1960—XXIst INTERNATIONAL GEOLOGICAL CONGRESS, Copenhagen, Denmark. Field excursions to Scandinavian countries.

GEOLOGIST

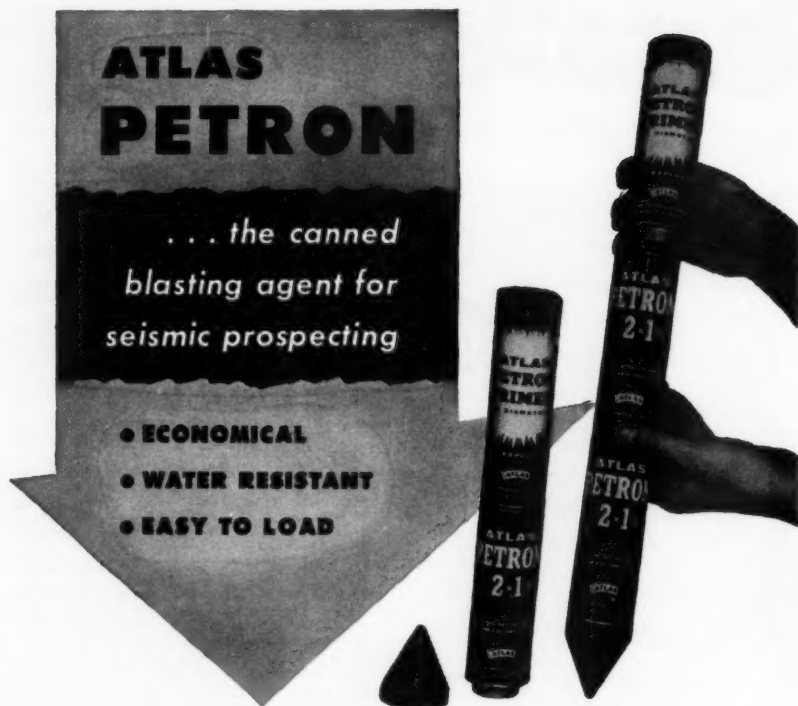
meets

SCOUT

*... October is here
and geologists everywhere are working
with Boy Scouts*

Photographed on our GEOTIMES Cover this month is Bryan Lewis, age 13, son of Mrs. Ruth Lewis, 5141 Newton St., Denver, Colorado, who is an Eagle Scout of Troop 43 of the Denver Area Council. Bryan is one of three brothers attaining the highest order of Scouting—the rank of Eagle. He has earned the Geology Merit Badge, is a senior patrol leader, and has been a recognized leader throughout his Scouting career.

Eagle Scout Lewis is shown here with Denver Consulting Geologist N. S. Cook, Jr., in the scenic Front Range geologic area, Red Rocks Park, west of Denver. Cook is active in the R.M.A.G. The photo is by Vernon Jones, Public Relations Director, Denver Area Council, BSA.



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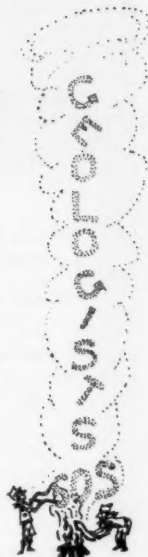
Robert C. Stephenson,
EDITOR

Kathryn Lohman
CIRCULATION MANAGER

Vol. II, No. 4

October, 1957

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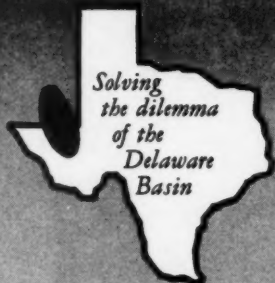
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Professional Leadership

Geologists interested in viewing their profession in historical and scientific perspective will find "Science in the Federal Government" by A. Hunter Dupree (Harvard University Press, 1957, \$7.50) fascinating reading. They will find that well over a hundred years ago "geologists as professionals were a better organized and more self-conscious group than were the followers of any other science." "As early as 1840 ten geologists, mostly connected with the state surveys, met in Philadelphia to form the Association of American Geologists and Naturalists." In 1848 this organization became the American Association for the Advancement of Science, which has had a long and distinguished history and which survives as a vital force in science today. In the creation of the National Academy of Science geologists do not appear to have been active participants. In 1879 the U. S. Geological Survey came into being, largely through the efforts of John Wesley Powell, who became its second director. It was at a gathering in Powell's home that the Cosmos Club was conceived in 1878 and he became its first president. During the first 48 years of the club's existence seven of its presidents were geologists, the last being George Otis Smith in 1926. No geologist has occupied the post since.

All of this gives the impression of high order leadership by geologists in the scientific community. More recent evidence of this is more difficult to find. Very shortly the A.G.I. will be celebrating the tenth anniversary of its founding. It is to be hoped that when future geologists survey the past, they may view A.G.I. as the embodiment of the capacity for leadership, organization and cooperation of the geologists of its day and that those may be worthy counterparts of those of earlier generations. No worthier objective can now be suggested to the members of the profession for which A.G.I. stands.

E. A. Eckhardt



OUR COVER

Denver Eagle Scout, Bryan Lewis, pictured with geologist N. S. Cook, Jr., in Red Rocks Park (see page 1).
Photo by Vernon Jones.

The AMERICAN GEOLOGICAL INSTITUTE is a non-profit professional service organization established and managed by the scientific societies in the fields of geology and geophysics in cooperation with the National Academy of Sciences-National Research Council. It is the instrument of the profession serving and advancing the welfare of the geoscientist in matters relating to education, professional responsibilities and government relations. It is an active member of the Scientific Manpower Commission. It also functions in the stimulation of public education and awareness of the earth sciences, through career literature, the scouting program and other channels of communication.

GEOTIMES is the news magazine of the geological sciences. It reports on current events in the earth sciences, public education and public relations efforts throughout the profession, as well as appropriate legislative and governmental issues. It announces scholarships, fellowships, publications and new developments. It provides a forum for discussion of timely professional problems, and affords a common bond between the many specialized groups within the earth sciences.



BATTLE of the BONES

*Cope and Marsh,
the paleontological
antagonists*

by EDWIN H. COLBERT

Among the paleontological giants of Victorian times the names of Othniel Charles Marsh and Edward Drinker Cope will long live in the factual history and the folklore of our science. These two men, Marsh a vertebrate paleontologist, Cope also a vertebrate paleontologist, but in addition a great herpetologist and an ichthyologist of note, were colorful characters of the first magnitude, each plentifully endowed with lots of energy, numerous original ideas, and a fair share of human cussedness. In the prime of their lives, when they were both going at full steam, the North American continent wasn't quite large enough to accommodate the two of them. Consequently they became bitter rivals, engaged in a scientific and personal feud the likes of which has most happily never since been equalled.

Marsh, who during most of his mature years was professor of paleontology at Yale, was born at Lockport, New York, in 1831. He was a country boy back in the days when rural America was truly rural, and it seems evident that he developed a love of nature at an early age. His mother died when he was quite small, and as he grew into manhood he gradually drifted away from his father, to form a warm relationship with his uncle, George Peabody. Mr. Peabody was a very wealthy man. He subsidized Marsh's education at Yale and after that at the universities of Berlin, Heidelberg and Breslau. After Marsh's return from Europe he was in 1866 appointed to the chair of paleontology at Yale, and there he spent the rest of his life.

Marsh was at this point in his life the lucky recipient of the kind of good fortune that most of us experience only in our dreams—in short, he was endowed with an independent income by his appreciative uncle, Mr. Peabody. From his early thirties until the day of his death Marsh had no real financial worries. He remained a bachelor all of his life. Is it any wonder, then, that he became a self-centered and wilful man?

Cope was born in a large, gracious stone house of Colonial vintage that still stands on Old York Road in Philadelphia. His father was a wealthy Quaker, a man of culture and of social responsibility. Cope's mother died when he was quite a small boy—an interesting parallel to Marsh's early history—but Cope was fortunate in that he soon acquired a devoted and un-

derstanding stepmother. His early life was a very happy one, spent in comfortable circumstances.

At an early age Cope showed a precocity of mind that was truly amazing. When still quite a young lad he was making pertinent observations on the sclerotic plates in ichthyosaurs, as a boy of high school age he was writing detailed notes on the modern reptiles of eastern Pennsylvania, and at the age of nineteen he published his first scientific paper. His early career paralleled Marsh's in that he, too, went to Europe to study. On his return he taught for a while at Haverford College, but institutional life never suited Cope. For most of his adult years he was an independent investigator, living in part on the fortune that he inherited from his father. Incidentally, Cope had the bright idea that he could multiply his fortune by investments in western American and Mexican mines. Alas! He suffered the fate so common to amateur financiers; within a

¹ Dr. EDWIN H. COLBERT is curator of fossil reptiles and amphibians at the American Museum of Natural History in New York and is professor of vertebrate paleontology at Columbia University.

decade he had lost most of his inheritance, so that he ended his life as a comparatively poor man.

Cope married a cousin, Annie Pim, and they had one daughter.

Cope was one of the most brilliant scientists ever produced in North America. It is significant that vertebrate paleontologists, herpetologists and ichthyologists all consider him as a great nestor in their fields. His published output was prodigious, to say the least.

Since he was a brilliant man, and had grown up accustomed to the advantages of wealth, it is hardly to be wondered at that Cope was a very independent individual. Perhaps he was not as self-centered as Marsh, yet none the less he was a man who could brook little opposition. He had definite opinions about many things, and he was just a bit belligerent in expressing them; the Quaker virtue of meekness was never a part of his character.

STARTED AS FRIENDS

These two headstrong men became acquainted with each other at the beginning of their respective scientific careers, and at first they were quite friendly with each other. Indeed, during the early spring of 1868 they joined each other for a field trip in the New Jersey coastal plain, to look for the remains of Cretaceous reptiles. This happy state of affairs was not destined to last for long.

In 1871 Cope decided to visit the Bridger Basin, to collect Eocene mammals, and in doing this he was invading an area considered by Marsh as his own exclusive stamping ground. So the fireworks began. Marsh could not forgive Cope for horn-ing in on his private preserves, Cope did not think that he was horn-ing in. The Bridger Basin is a big place and Cope thought he was perfectly well justified in going there to collect fossils. Perhaps each of them was indulging in a bit of rationalization.

If Marsh and Cope had lived ten thousand years ago they certainly would have gone for each other with stone hatchets. As it was they did just about everything the law will allow, to cut each other down. Each of them had assistants who did most of their collecting. These collectors were instructed to work in the greatest secrecy; on no account were localities to be divulged to rivals. If a specimen could not be completely collected because of lack of time or other circumstances, no bones were to be left in the ground for the enemy; they were to be destroyed. Things came to such a pass that on at least one

occasion Marsh men and Cope men tangled in an old-fashioned rough and tumble out in the wilds of Wyoming.

As for the chief protagonists, theirs was to be in part a battle of priorities. They were both discovering or having sent to them great quantities of wonderful new fossils, hitherto unknown to the world of science. Many of the specimens in each collection came from the same sediments. Who would name them?

SHENANIGANS

Marsh and Cope indulged in some fancy shenanigans during their long-continued efforts to beat each other to the punch. The matter of a new name was for these two adversaries often a matter of days only, so intense was the rivalry. Cope enjoyed something of an advantage over Marsh in this respect, because he had purchased "The American Naturalist," thus establishing himself as the owner and editor of a recognized scientific journal. Consequently Cope could grind out new names and new descriptions about as fast as the presses could roll. Marsh had "The American Journal of Science" at hand for the publication of his new discoveries, so he wasn't far behind Cope in this respect. The new names and descriptions followed in rapid succession and in the course of things there arose some ugly charges by Marsh that some of Cope's papers had been predated, so that they would appear to have been published earlier than they actually were. Naturally such accusations aroused strong feelings accompanied by strong words.

It even got to the point where Cope telegraphed in descriptions of new fossils from the field; he couldn't be bothered with waiting until his return to Philadelphia. Such haste between the pick and the pen was bound to lead to some strange results. The name *Lefalaphodon* was published on August 19, 1872, just three days after Cope telegraphed a name and description from Wyoming. On September 19 a correction was published—it should have been *Loxolophodon*. The telegrapher had mixed things up a bit—and Cope did write with an execrable hand.

This contest of collectors and priorities reached its climax during the summer of 1877, in what might fittingly be called the "Morrison War." This was the year that Marsh began his long and elaborate series of quarrying operations in the Morrison formation at Como Bluff, Wyoming, while Cope was similarly employed at Canyon City, Colorado. Perhaps it would be more

Continued on page 14

FALL MEETING CIRCUIT

offers varied diet of geology-geophysics

The annual meeting of the Geological Society of America will draw many geologists to Atlantic City during the first week in November. Also meeting with the GSA will be the Geochemical Society, the Society of Vertebrate Paleontology, the Mineralogical Society of America, the Association of Geology Teachers, the Society of Economic Geologists, and the Paleontological Society. Several thousand geologists, principally from the eastern seaboard, are expected to attend.

During late October and early November there are many meetings of interest to geologists, particularly in the Mid-Continent and Southwestern areas. They range from local field trips to meetings of regional and national significance. The 12 local geological societies which comprise Gulf Coast Association of Geological Societies will convene at the Roosevelt Hotel in New Orleans, November 6-8 for geological sessions and probably a little bit of Sazerac and maybe a bit of Bourbon Street. A review of the *GEO TIMES* Calendar on page 1 will show other meetings of interest.

AAPG MID-CONTINENT REGIONAL MEETING

Tulsa, Oct. 31-Nov. 1

An estimated 1000-1500 geologists will gather in Tulsa for the two-day session sponsored by the Tulsa Geological Society in cooperation with the Mid-Continent Council of Geological Societies. Headquarters will be at the Mayo Hotel and the technical sessions will be held in the Education Building at the Tulsa Fairgrounds. Theme of the technical program will be Paleozoic Stratigraphy and Sedimentation in the Mid-Continent Area. Among the number of interesting papers will be "The Mid-Continent Land of Geological Opportunities" by A. I. Levorsen and "Shore Line Sandstone Characteristics and Criteria for Recognition of Each" by N. W. Bass. There will be interesting entertainment for ladies and a field excursion is planned to visit Paleozoic localities in eastern Oklahoma.

NATIONAL WATER WELL EXPOSITION

Oklahoma City, November 5-8

The National Water Well Association is devoting its entire technical program at

the Oklahoma City exposition to groundwater problems and studies which will be of great interest to geologists. H. F. Smith and Frank C. Foley are scheduled to serve as chairmen of technical sessions. Information may be obtained by writing the NWWA, P.O. Box 222, Urbana, Illinois.

SOCIETY OF EXPLORATION GEOPHYSICISTS

Dallas, Nov. 11-14

"International Geophysics, Both Pure Science and Practical Applications" will be the dominant theme of the 27th Annual Meeting of the Society of Exploration Geophysicists in Dallas, Texas, Nov. 11-14.

In pure science, the International Geophysical Year (I.G.Y.) will naturally be given great attention, because SEG is one of the sponsors of this world-wide coordinated attack on pure scientific problems where political complications are at a minimum.

J. W. Joyce, Head, Office for I.G.Y., National Science Foundation, Washington, D. C.; J. Tuzo Wilson, University of Toronto, Canada; and Paul Lyons of Tulsa, Oklahoma, the Past President of S.E.G. and currently Chairman of the S.E.G. Liaison Committee with I.G.Y. will give papers on this timely subject.

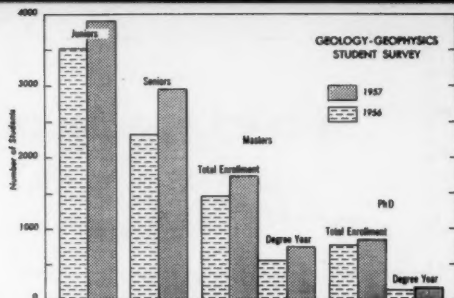
Middle East political uncertainties, plus recent important oil discoveries in French North Africa and Turkey have made oil developments in these areas of vital importance to the whole Western Anti-Communist world. Three papers on practical geophysical problems in oil exploration in French North Africa will be given by French geophysicists, and one on Turkey will be given by S. Diker, of Ankara. In the western hemisphere there will be a paper on Guatemala and one on the Caribbean area.

In the search for possible commercial deposits of oil and other minerals in foreign countries, geophysicists find that local national and international policies may present problems just as difficult as those Mother Nature presents to those who would uncover her hidden mineral wealth.

So, the S.E.G. will hear practical papers with such titles as "Geophysics and Geopolitics," "Inter-dependence in World Wide Oil Exploration," "Orientation of Personnel in Foreign Operations," and "Logistics in Foreign Operations."

1957 STUDENT SURVEY

**Shows Geology
Graduates up
sharply over 1956**



Graphic comparison of 1956 and 1957 surveys of geology and geophysics students in the colleges and universities of the United States. Based on Spring 1957 survey by the AGI.

ACADEMIC LEVEL	UNITED STATES						CANADA	
	Geology			Geophysics			Geology	Geophysics
	1957	1956	% change in 1957	1957	1956	% change in 1957	1957	1957
Undergraduate								
Seniors	2928	2269	29.04	54	58	- 6.90	182	5
Juniors	3819	3421*	11.63	86	84	2.38	232	14
MA Program								
Degree year	693	483	43.48	43	27	59.26	45	5
Total enrollment	1644	1391	18.19	76	87	-12.64	91	9
PhD Program								
Degree year	167	150	11.33	23	20	15.00	17	2
Intermediate year	374	305	22.62	49	52	- 5.77	20	3
First year	213	229	-7.00	6	27	- 7.78	18	1
Total enrollment	754	684	10.23	78	99	-21.21	55	6

* 32 colleges failed to report their junior students in 1956.

Table comparing geology-geophysics student enrollments at various academic levels in colleges and universities of the U. S. and Canada in 1957 and 1956.

	Colleges Queried	Colleges Responding	Total Geology Geophysics Students	No. in Geology	No. in Geophysics	Per cent Undergrad.	Per cent in MA Program	Per cent in PhD Program
U. S. 1957	207	204	9439	9145	294	72.96	18.23	8.81
1956	205	194	8093	7765	328	72.06	18.26	9.68
% change in '57		5.15	16.63	17.77	-10.37			
Canada 1957	16	16	594	560	34	72.90	16.83	10.27

Table summarizing the student population in geology and geophysics in colleges and universities of the U. S. and Canada in 1957 and 1956.

A survey conducted by the American Geological Institute in the Spring of 1957 shows a sharp upswing in students majoring in geology. There were nearly 30 per cent more seniors graduating with majors in geology in the class of 1957 than in the previous year. More masters and Ph.D. degrees also were granted. The indications are that the 1958 graduates may be even more numerous.

This is the second annual survey of geology-geophysics students undertaken by the American Geological Institute in conjunction with activities of the Earth Science Register Project conducted in cooperation with the National Science Foundation. The results of the first survey were published in detail in AGI REPORT 12¹

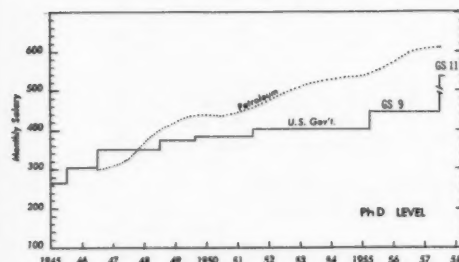
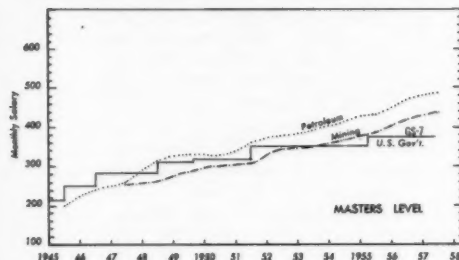
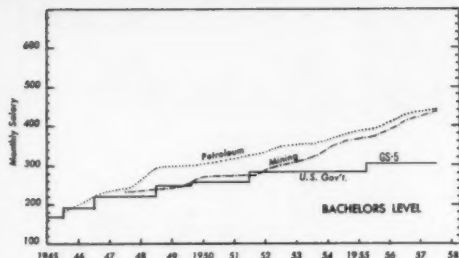
Survey of Geology-Geophysics Students in the Colleges and Universities of the United States in 1955-56 and of Available Scholarships, Fellowships, Assistantships, Etc. The 1957 survey results soon will be published in detail by the Institute and the availability of the report will be announced through *GEO TIMES*. The 1957 survey was extended to include Canadian schools, but the survey of scholarships, fellowships, etc., found in the 1956 Report 12 will not be included more often than every 3 or 4 years.

Continued on page 13

¹ Available from the American Geological Institute, 2101 Constitution Ave., N.W., Washington, D. C. Price \$0.50. Payment should accompany order.

Starting Salary Trends

**Survey 1945-57
shows growing
emphasis on
graduate training**



Graphic comparison of average starting salaries for inexperienced geological graduates at the bachelors, masters and Ph.D. levels of training entering employment in the petroleum and mining industries and the Federal Government for the years 1945-1957. Based on March 1957 survey conducted jointly by the Scientific Manpower Commission and the American Geological Institute.

A survey of starting salaries in geology and geophysics for the period 1945-1957 has recently been completed by the Scientific Manpower Commission and the American Geological Institute. A number of mining and petroleum companies cooperated in providing these data which are believed to present a reasonably accurate picture. The survey was undertaken to supply often-requested figures on salary trends in the post-war era.

The results obtained are presented here in graphic form for geologists entering industry at the bachelors, masters and Ph.D. levels. The salary scales for geophysicists in the companies surveyed were so close to the scales for geologists that separate curves were considered unnecessary.

Plotted along with the average entering salaries for geologists in the petroleum and mining industries are the equivalent Civil Service scales for geologists and geophysicists entering the service of the U. S. Geological Survey and other government agencies.

Certain observations are significant and should be mentioned. Although these scales are presumably for raw, inexperienced recruits, the requisites for employment vary from company to company and from year to year. These variables influence the starting salary scales.

The data presented on starting salaries for Ph.D.'s is probably the least accurate of the three groups considered, inasmuch as companies usually weigh the man, his area of specialization, his related experience and his importance to their needs in bidding for his services.

A comparison of curves for the petroleum industry at the three levels of academic training indicates that there is a greater recognition of the value of graduate training in geology by the oil exploration

AVERAGE STARTING SALARIES OF GEOLOGISTS - DOLLARS PER MONTH

	Petroleum			Mining			U. S. Government			Date Increase Effective
	BS	MS	PhD	BS	MS	PhD	BS GS5	MS GS7	PhD GS9	
1945	\$183	\$200	-	-	-	-	\$166	\$217	\$267	
1946	220	238	-	-	-	-	193	248	303	7-1-45
1947	243	261	-	\$235	\$250	-	220	283	346	7-1-46
1948	292	312	\$400	240	265	-	"	"	"	
1949	299	334	432	250	285	-	248	311	375	7-1-48
1950	308	333	432	270	300	-	258	319	383	11-1-49
1951	325	361	468	275	305	-	284	350	432	7-1-51
1952	350	381	494	300	350	-	"	"	"	
1953	360	395	518	340	365	-	"	"	"	
1954	377	414	533	360	385	-	"	"	"	
1955	390	432	551	375	400	-	306	377	453	3-12-55
1956	433	469	604	410	435	-	"	"	"	
1957	442	483	612	440	460	\$525	"	"	533 GS11	7-57

Table showing trends in average starting salaries in the petroleum and mining industries and the Federal Government for years 1945-1957.

GULF COAST SOCIETIES ACT TO AID AGI

The Executive Committee of the Gulf Coast Association of Geological Societies made a contribution of \$500 to the American Geological Institute on behalf of the members of the 12 local geological societies in Gulf Coast areas of Florida, Mississippi, Louisiana and Texas.

In his letter of transmittal, GCAGS President H. N. Hickey said "This contribution is offered as tangible evidence of commendation by our Association of the AGI program to advance the interests of the geological professions."

This action and spirit of the action is sincerely appreciated by the Institute.

tion industry in the last several years than there was in the immediate post-war years. Not only is this reflected in salary trends, but it has also been noted by professors of geology in a number of schools reporting on 1957 recruiting activities.

The mining industry employs far fewer geologists than the petroleum industry, so that the starting salary information is more spotty. Mining companies hire relatively few Ph.D.'s in geology and with varying frequency, so that a trend of starting salary for Ph.D.'s entering mining companies cannot be plotted. Perhaps the most significant point of interest in starting salaries in mining is the upswing at the bachelor's level beginning in 1953. This may well reflect the recent increase in organized, long-range exploration programs guided by geologist executives in some of the more progressive mining companies.

The trends in starting salaries for geologists entering government service is discouraging, especially at the bachelor's level. The comparison of curves shows that the federal government was competitive with industry between 1945 and 1949, but in more recent years, the spread between government and industry has widened rapidly. A recent jump from GS grade 9 (\$5440) to GS grade 11 (\$6390) for Ph.D.'s entering government service has closed in part the large gap between government and industry.

With the possible exception of any 1957 Rip Van Winkles, persons studying these curves, which indicate rises varying 100 per cent to nearly 150 per cent over this 13-year span, are quick to realize that there has been little, if any, gain compensation. The increases have paralleled and been primarily in response to spiralling costs of living.



For some time your correspondent has been dimly aware that there is in this country a species of hobbyist known as the rockhound. On a very elementary level, let us investigate this interesting individual.

1. *What is a rockhound?* He is either (a) a person interested in collecting minerals, for their beauty and scientific interest, or (b) a cut-and-polish fan, or lapidary. Some rockhounds also pay attention to rocks, fossils, and ancient artifacts. Junior rockhounds are known, regrettably as pebble puppies.

2. *How many are there?* Estimates differ widely. A reasonable figure for total membership in U. S. rock and mineral societies is 40,000. Mineral dealers believe that for every club member there are 10 or 15 active nonmembers—say a total of 500,000 true believers. This, you need hardly be reminded, is 25 times the number of geologists in the country.

3. *Are they organized?* You bet. The typical rockhound belongs to a club or society, with a membership of 20 to 100 or so. The club belongs to one of the six regional Federations of Mineralogical Societies: California, Northwest, Rocky Mountain, Midwest, Texas, and Eastern. And the federation, in turn, belongs to the American Fedminsocs (home-made abbreviation), the top of the heap. There are at least 1,000 local societies in the country—131 in California alone. So you can see that the rockhound is as well organized as a teamster; possibly better.

4. *What do the local clubs do?* They meet once a month, for a session of slides, movies, or talks about minerals; sometimes about geology, mining, or allied topics. They go on field trips. They sponsor publications, from the humble mimeographed newsletter to the slick-paper illustrated magazine. They stage annual whingdings. They talk, trade, read, and learn.

More on this subject next month. In the meantime, we give you 6-year-old Danny Marshall, of Indianola, Iowa. His collection, which he refers to as "wocks," earned him a first-prize ribbon at the Iowa State Fair. Danny is plainly the Wockhound of the month.

If you have a story on Geology in the Public Eye, write: Dr. Bates, Dept. of Geology, Ohio State Univ., Columbus, O.



MANPOWER in a column -

By HOWARD A. MEYERHOFF
Scientific Manpower Commission

This issue of *GEO TIMES* reports the results of two surveys: one designed to determine how many college and graduate students are studying geology; the other to determine starting salaries paid to geologists in the past 12 years. The Office of Education has a longer record of degrees granted, and it shows a noticeable drop from 1950 to 1955. But during the past three years there has been a sharp upturn—more marked in geology than in any other scientific field.

When the trends revealed by these surveys are correlated, the result is a paradox. Salaries appear to have risen more sharply when students were most abundant—for example, from 1945 to 1950, particularly in the petroleum industry; and in the mining industry from 1952 or 1953 up to the present. This year, in fact, the two curves met, and mining geologists have commanded salaries that are just as good—at least at the Bachelor's level—as those of petroleum geologists. Geologists in the government haven't done so well—nor, for obvious reasons, has the government been so successful in getting geologists.

The rise in the number of graduating geologists, not to mention the prospective continuation of this upward trend in 1958, is bound to raise the question as to whether we may be training too many geologists, and whether the law of supply and demand may not soon set to work in the direction of reduced salaries. Prediction is dangerous, and for a short time range it may prove completely unreliable. For the long term, however, it is fairly safe. One need merely refer to the report of the Advisory Committee on Minerals Research, published last year by the National Science Foundation, to learn something about the future demand for earth scientists. Our dwindling ore reserves have long provided material for many a theme song, but the profession is indebted to George Fowler and his associates for pointing out the fact that 90 percent of our metallic wealth has come from a scant thousand square miles of our domain. The applications of geophysics, geology, and geochemistry in the discovery of a second thousand square miles must be as obvious as the need to start such a research if we are to protect our national economy and security with essential mineral raw materials. We may

COMMITTEE OF 100 GROWS

In November we expect to publish the full list of 57 geologists and geophysicists who have pledged membership to the Committee of One Hundred for AGI. Additions to the Committee since August are as follows:

George W. Pirtle
John M. Birdsall
Noel H. Stearn

This Committee, the membership of which includes outstanding leaders in the profession, is playing a vital role in solidification of the American Geological Institute. Members of the Committee of One Hundred pledge to contribute \$100 per year for 5 years to provide a stable, predictable element in AGI's financial picture during these critical years ahead.

NATIONAL SCIENCE YOUTH MONTH

October is not only Geology Month in Scouting; it is also National Science Youth Month. During this period nearly a half million boys and girls in schools across the nation will be organizing the program of activities for some 1,700 Science Clubs of America. Individual scientists or scientific groups can aid in starting a local science club by providing sponsorship and other assistance. Science Fairs, plant and laboratory tours, career guidance programs in which science-minded youth and professional scientists work together not only stimulate careers in the sciences but also engender a better public understanding of the sciences and scientists.

The science club members orient their activities toward two annual major national events—the Science Talent Search and the National Science Fair, which offer significant recognition to the promising youth for his scientific achievements. If you want to aid in the organization of school science clubs which can qualify for membership in the Science Clubs of America, write SCIENCE SERVICE, 1719 N St., N.W., Washington 6, D. C.

not be able to predict the salaries that will be paid or the rate at which specific jobs will be created to meet the needs so clearly outlined in the NSF study; but we do know it will take all the highly talented manpower we can find to carry on the scientific exploration needed to meet our national needs for mineral raw materials.

Popular Geology in Print

by Mark W. Pangborn, Jr.

Two of the handsomest geology books ever to reach this reviewer are the second edition of *Frederick H. Pough's FIELD GUIDE TO ROCKS AND MINERALS* (Houghton Mifflin, 1955, \$3.95) and *ROCKS AND MINERALS*, by *Herbert S. Zim and Paul R. Shaffer* (Simon and Schuster, 1957, \$2.50). Pough's systematic field book, with its descriptions of nearly 300 minerals, 260 photos, 77 in well-registered color, but no recognition tables, is fine for the serious amateur; Zim and Shaffer's much more informal little volume, with 400 illustrations—all of them in color—is just right for the beginning amateur or the high school student.

Even the most self-satisfied geologist, whose interests normally stop at the top of the Pleistocene, will be charmed by *May Theilgaard Watts' READING THE LANDSCAPE: AN ADVENTURE IN ECOLOGY* (Macmillan, 1957, \$4.75). Mrs. Watts selects a number of areas—such as a mountain top, a prairie field, and a dune belt—and shows how the past history of the area can be read from the vegetation; delightful pictures and fine brief bibliographies are provided.

In *ARCTIC FRONTIERS; UNITED STATES EXPLORATIONS IN THE FAR NORTH* (U. of Oklahoma Press, 1956, \$3.75), *John Edwards Caswell* tells the story of America's part in the exploration of the Arctic, from DeHaven's search for Franklin in 1849 until 1909, when Peary reached the Pole. *Walter Sullivan's QUEST FOR A CONTINENT* (McGraw-Hill, 1957, \$5.50), is a most enjoyable history of Antarctic exploration, stressing the more recent campaigns leading up to the I.G.U. investigations now in progress.

In *BRING 'EM BACK PETRIFIED* (Dodd Mead, 1956, \$4), *Lillian Brown* paints a gay picture of fossil hunting in Guatemala with husband *Barnum Brown*. *Helen Raitt's EXPLORING THE DEEP PACIFIC* (Norton, 1956, \$3.75) vividly depicts core-taking and echo-sounding activities aboard a Scripps Institute ship. *J. L. B. Smith, in THE SEARCH BENEATH THE SEA* (Holt, 1956, \$3.95), stirringly describes his 14-year hunt for the now-famous *Coelacanth*, supposedly extinct some 70 million years.

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STUDENT SURVEY, Continued from page 9

The 1957 survey sheet was mailed to 207 departments of geology and geophysics in colleges and universities in the United States and to 16 in Canada. Only 3 schools of the 207 surveyed neglected to return the completed form. All Canadian schools responded. The 1957 data are more complete than last year, with those twenty-two schools who neglected to report third year students in 1956 reporting 296 seniors in 1957.

The accompanying tables and graphs show the story most effectively. Persons who are interested in studying the trends in student population and in graduating geologists will find it interesting to compare these results with the annual survey by A. I. Levorsen as reported in the AAPG Bulletin.² Dr. Levorsen has regularly surveyed 75 schools over a period of years.

The survey data on students of geophysics, who may be expected to enter the geophysics profession, are quite misleading. There are relatively few departments of geophysics in colleges and universities. Geophysics majors are offered by some geology departments. Many persons enter the geophysical profession with a degree in either geology or physics. It has not been possible for the AGI to extend this survey to students of geophysics graduating from physics departments, although such coverage would make the survey more useful and accurate.

It is the desire of the Institute to develop more statistics about the profession which will enable the more accurate charting of significant trends.

² A. I. LEVORSEN, *Survey of College Students Majoring in Geology*, AAPG Bull. vol. 41, no. 5, p. 968.

AAPG FILM DIRECTORY

The Directory of Films and Slides of Possible Interest to Geologists was published in 1951 by the AAPG, having been prepared by its Committee on Applications of Geology. The AAPG recently turned the remaining stock of this 39-page pamphlet over to AGI. The Institute will realize income from its sale and will be responsible for future editions. It may be obtained from the *American Geological Institute, 2101 Constitution Ave., N.W., Washington 25, D. C.* Cost \$0.50, payment with order.

ANTAGONISTS, Continued from page 7

accurate to say that Marsh's men and Cope's men were hard at work in the two areas, excavating gigantic fossil bones to be shipped back to New Haven and Philadelphia. These were the fossil remains of the Morrison dinosaurs, now so well known in museums, monographs and books, but then coming to light for the first time. Of course it was exciting, not only to Marsh and Cope, but also to scientists all over the world and to a considerable segment of the public. The men in the field sweated it out through the hot summer months and on through the snows of winter, packing tons of fossils in huge boxes to be shipped back east. The race for new names continued. Marsh was definitely the winner, naming 19 genera of Morrison dinosaurs, whereas Cope trailed along with only 9 genera. Perhaps part of Cope's trouble was the old story of too many irons in the fire. He was going hither and yon back and forth across the continent on varied and unrelated field trips, he was immersed in studies on many fossil vertebrates, on modern reptiles and amphibians and fishes, and he was editing and publishing *The American Naturalist*. He just did not have time to look at all of his Morrison fossils, as is proven by the fact that when the American Museum of Natural History purchased his collections, after his death, one series of large unopened boxes from Canyon City yielded the fine skeleton of *Allosaurus*, now on display in New York.

FEUD INVOLVED MANY

During the next decade the Marsh-Cope battle became bitter and complex, to such an extent that many people got caught up in it, some of them quite unwillingly. It involved various members of the old Territorial Surveys with whom Marsh and Cope were working, it involved people in other government departments, it involved the National Academy of Sciences, it involved John Wesley Powell and the Secretary of the Interior, and it made fine stuff for the newspaper reporters to brew and serve up. Throughout this long-continued fight Marsh had the better of it. He enjoyed a powerful position as President of the National Academy. He was a cool and skilled antagonist, with many influential forces at his command, and he used his resources of men, influence and money with good effect. Cope, on the other hand, was more the lone fighter, but he fought brilliantly and with his accustomed belligerence.

It was, in the end, all rather pointless. There were enough fossils for both of them (even now their great collections are not completely studied) and there was enough

honor for both of them. Yet these two stiff-necked, forceful, opinionated men could not comprehend such simple truths, and they fought each other fiercely to the end of their days. Cope died in 1897, a poor and lonely man surrounded in his Philadelphia home by fossil bones, jars full of alcoholic specimens of reptiles and fishes, and great disorderly stacks of books and pamphlets. Marsh died in his rather palatial New Haven home in 1899, and although his final hours were perhaps spent in more dignified surroundings than were the last days of Cope, he none the less passed out of this world a very lonely, unapproachable man.

PALEO LEGACIES

The legacies of fossil collections and published works left by these two pioneers of vertebrate paleontology in North America will remain with us as long as the earth sciences are studied, and as long as people the world over thrill to the sight of the great beasts that once lived upon our globe. Both men established themselves as giant figures in the history of paleontology. Of the two Cope was by far the greater scholar; the 1400 titles that comprise his bibliography, titles that bespeak him as a master in three separate fields of scientific research, are a sure indication of the incomparable energy and brilliance of this man. Marsh was the better administrator and manager; his published works do not bulk up as do Cope's nor are they so varied, but his standing among the men of science of his day indicates a superb skill in advancing his own cause. Among his contemporaries Marsh was the man of influence and position, but today, three quarters of a century later, Cope looms as the man of true genius.

In spite of all the troubles they caused to each other and to many other people, Marsh and Cope enriched the intellectual climate of the late nineteenth century. Their accomplishments were many and great, and we of this generation benefit greatly from what they did. They made paleontological history, and they made it noisily, lustily and with great gusto. In many ways it must have been a lot of fun.

27,000 READ GEOTIMES

The October issue of *GEOTIMES* will go to nearly 27,000 geologists and geophysicists as the AGI continues to add members of member societies to its mailing list. By the end of 1957 all earth scientists entitled to receive *GEOTIMES* will be on the mailing list which is expected to reach 30,000 or more.

GEOTIMES

LETTERS

TO GEOLOGISTS EVERYWHERE:

The activities of approximately 68,000 Boy Scout troops and Explorer units this month, as they carry out projects related to geology, will truly make one of the biggest shows that our old globe has witnessed in many an age. If all the "rock hounding," exploration and projects on geology attempted by Scouts could be presented in one panoramic picture, it would be a most amazing "show" to behold. New worlds of knowledge and adventure will be opened to Scouts that will extend long beyond the mere 31 days of this month.

We wish to take this opportunity to express sincere gratitude to our Scouter-geologist advisors for their untiring efforts in preparation for this program. We would like to express appreciation also to every geologist who will assist Scout troops with activities during October. Many lasting friendships will come from this association and undoubtedly the career opportunities in geology will challenge the imagination and future plans of many Scouts.

One of the less evident aspects of this program will be the citizenship training values that take place in the lives of boys as Scouts and geologists explore together the greatest show on "Earth."

Very truly yours,

DONALD H. BARNETT
Assistant Director, Boy Scouting Service
BSA, New Brunswick, N. J.

DEAR EDITOR:

Geologists who believe that all geophysicists do is set off "fire crackers," record echoes and dream-up maps seem to have a counterpart among the geophysicists. Or perhaps Waldo E. Smith, Executive Secretary of the American Geophysical Union, could not distinguish different kinds of Unions through the Washington fog when he wrote you last month that geology is concerned only with particular units of land, "the land on which a man lives," apparently the surface alone. What he refers to is simply a small *part* of geology; for many years the term as generally used has referred to the science of the earth as a whole. The narrow view held by Dr. Smith seems to be common only around Washington and some federal outposts.

The study of the earth is based on the

fundamental sciences of mathematics, physics, chemistry and biology. Where the predominant aspect of the study is the application of physical techniques the term geophysics is appropriate. But even the "purest" geology is based on physical principles; the stratigraphic law of superposition is elementary physics. However, since geology *can* be taken out of physics, some "geophysicists" try to ignore the geologic medium in which they operate. Their error is evident to those who compare the results of this type of geophysics with direct information obtained by drilling wells.

We geologists generously allow the Geophysical Unionists to make their measurements on our land. We wish that they, in turn would not try to reduce us to a mere boundary between their atmosphere and lithosphere. In such a pinch we might have to join their Union as Tectonophysicists!

Very truly yours,
DEWITT C. VAN SICLEN
Bellaire, Texas

DEAR MR. STEPHENSON:

This is just a note to thank you for your letter of August 1, calling my attention to the article on H.R. 7431 in the copy you enclosed of this month's *GeoTimes* magazine.

There is certainly good scientific justification for the establishment of a geophysical institute in Hawaii, although the National Science Foundation does not feel that such an institute could be supported at the present time from its regular budget because of the many urgent demands being made on the Foundation for research needs having a higher priority. Consequently, it would take a special appropriation by the Congress as proposed in H.R. 7431 and, as you know, the fiscal climate at this particular time is not very favorable as far as new projects are concerned.

I appreciate the interest of your organization in this legislation, however, and you can be sure that I shall have it in mind when this subject comes up in discussions in which I am participating.

With all best wishes,

Sincerely,
RICHARD NIXON
Vice President
United States of America

GEOLOGY PROGRAM FOR AAAS SECTION E

At the 1957 annual meeting of the American Association for the Advancement of Science, Indianapolis, Indiana, December 28-31, Section E, Geology and Geography, is to have an interesting program which has been outlined as follows by Frank C. Whitmore, Secretary:

Friday, Dec. 27

- A.M. Contributed papers on geography
P.M. Section E Smoker, with address by retiring Vice President Paul F. Kerr

Saturday, Dec. 28

- A.M. & 1. Symposium on Continental Glaciation and its Geographic Importance as an Environmental Factor (Geologic Portion)
P.M.
A.M. & 2. Symposium on Mississippian and P.M. Pennsylvanian Stratigraphy

Sunday, Dec. 29

1. Symposium on Continental Glaciation and its Geographic Importance as an Environmental Factor (Geographic Portion)
A.M. & 2. Symposium on Mississippian and P.M. Pennsylvanian Stratigraphy

Monday, Dec. 30

- A.M. Contributed papers on geology
P.M. Symposium on Karst

The symposium on the history of geology originally planned for the Indianapolis meeting has been postponed until 1958 when the AAAS meets in Washington, D. C.



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THE DESIGN AND CONSTRUCTION OF ENGINEERING FOUNDATIONS by F. D. C. Henry, 547 pp., 1956, McGraw-Hill Book Co., Inc., 330 West 42nd St., New York 36, N. Y., \$9.00

This reference book begins with a review of pertinent geological and soil mechanics principles essential to foundation engineering that goes on to discuss the various engineering and construction principles. This book should be of assistance to the engineering geologist who wishes more background on the engineering aspects of foundation problems.

BIBLIOGRAPHY OF NORTH AMERICAN GEOLOGY, 1940-1949, Part I—Bibliography, Part II—Index, U. S. Geological Survey Bull. 1049, 2205 pp., 1957, Order from Supt. of Documents, Gov't Printing Office, Washington 25, D. C., \$5.75 per set

No other comment is necessary than to say that this most important reference volume has arrived—at long last!

GLACIAL AND PLEISTOCENE GEOLOGY, by Richard F. Flint, 553 pp., 1957, John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y., \$12.50

In 1947 Dr. Flint published his book *Glacial Geology and the Pleistocene Epoch*, a classic work in the field. The importance of polar areas in global politics, coupled with rapidly developing methods of scientific investigation, has done much to stimulate greater research in glaciology. Dr. Flint approaches the subject of glacial and Pleistocene geology in the light of these findings. Not only does he treat the subject with thoroughness, but he includes also a comprehensive bibliography.

COAL SCIENCE, by D. W. van Krevelyn and J. Schuyler, 352 pp., 1957, D. Van Nostrand Co., Inc., 120 Alexander Street, Princeton, New Jersey, \$9.50

To the American geologist, the most valuable aspect of this succinct volume is that it surveys much of the coal research which has developed in the past 15 years, especially in the European laboratories. The authors have an unusually broad grasp of the science of coal as a rock and coal as chemical and physical matter. There are some minor discrepancies from the facts in a few instances, especially concerning the

results and extent of certain American coal petrographic research. But here in three brief parts—Coal in its various aspects, Constitution of the coal matrix, and Principal physical and chemical properties—which are carefully and skillfully brought into a unified account, the geologist may quickly read and easily understand much of the fact and philosophy back of the chemist's approach to coal constitution and development.

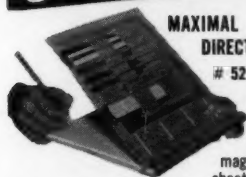
The English is clear, the presentation concise, the typography and binding attractive, and there is a minimum number of errors. This volume may well create better understanding and appreciation of the diverse approaches to coal research among coal chemists and coal petrographers.

A T C

Flotation by A. M. Gaudin, 573 pp., McGraw-Hill Book Co., Inc., 330 West 42nd Street, New York 36, New York, \$12.50.

This is an outstanding reference book on flotation, one of the most exacting forms of ore dressing. The importance of the mineralogy of ore and gangue minerals is developed by the author. The economic geologist, who early in property evaluation often must consider beneficiation, will find this book a helpful guide.

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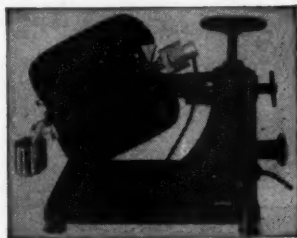
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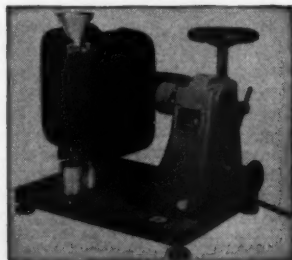
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